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## Setting reactions and compressive strengths of calcium phosphate cements.

**Fukase Y, Eanes ED, Takagi S, Chow LC, Brown WE.**

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Setting reactions and compressive strengths of a self-hardening calcium phosphate cement (CPC) were investigated. The CPC consists of tetracalcium phosphate (TTCP) and anhydrous dicalcium phosphate (DCPA). The cement specimens were prepared by mixing 0.7 g of the powder (TTCP 72.9 wt% + DCPA 27.1 wt%) with 0.175 mL of the liquid (25 mmol/L H<sub>3</sub>PO<sub>4</sub> and 1.32 mmol/L sodium fluoride). The specimens were removed from the molds at pre-determined time intervals after being mixed, and their compressive strengths were measured. Immediately afterward, the fractured specimens were rapidly frozen in ethanol (-80 degrees C), lyophilized, and examined by powder x-ray diffraction and scanning electron microscopy (SEM). The results showed that (1) hydroxyapatite was the only reaction product; (2) the reaction was nearly completed within four h, during which both the reaction product and compressive strength increased linearly with time, resulting in a strong correlation between the two; and (3) fully set CPC consisted primarily of small rod-like crystals and some platy crystals.

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